

### **REMARKS**

Claims 1-19 are pending in this application. Claim 20 is new. Applicants gratefully acknowledge the Examiner's indication that claims 10 and 11 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Upon entry of this Amendment, claims 1, 4, 11, 16, 17, and 19 will be amended to even more particularly point out and distinctly claim Applicants' invention. Support for the amendment to claim 19 can be found in example 42 of the specification. Claim 20 is being added, support for which can be found in claims 1 and 19 as originally filed, and page 14, lines 1 and 2 of the specification. No new matter is being added.

The specification is being amended to clarify typographical and obvious errors. Support for the amendment to page 17 is found in the Examples of the invention. No new matter is being added.

Reconsideration and allowance of the application respectfully are requested.

### **Claim Objections**

Claim 11 was objected to as being indefinite for using "preferable" language in the claim. Applicants have amended the claim to remove the cited language. Reconsideration and withdrawal respectfully are requested.

### **Claim Rejections**

Rejection Under 35 U.S.C. §102(b) and 35 U.S.C. §103(a)

(a) Response to Rejection of Claims 1-9 and 12-19 as being anticipated by or in the alternative obvious over U.S. Patent No. 4,247,667 to Nojiri et al.

In response to the rejection of claims 1-9 and 12-19 as being anticipated by or in the alternative, obvious over U.S. Patent No. 4,247,667 to Nojiri ("Nojiri"), Applicants traverse the rejection and respectfully submit that the cited references do not teach or suggest all the elements of the claims, and that a *prima facie* case of obviousness has not been made out.

In one embodiment of the present invention, claim 1 has been amended to recite a process for increasing the melt strength and/or the extensional melt viscosity of a polypropylene (co)polymer comprising melt mixing a polypropylene (co)polymer in the presence of a specified initiator, wherein the melt strength and/or the extensional melt viscosity of the polypropylene (co)polymer is increased during the melt mixing step. In another embodiment, claim 19 has been amended to recite a process for modifying an  $\alpha$ -olefin polymer wherein the process comprises melt mixing the  $\alpha$ -olefin polymer in the presence of a specified initiator and optionally a monoene monomer present in an amount of monomer from 0 to 3 times the total moles of initiator. In a third embodiment, claim 20 recites a process for increasing the melt strength and/or the extensional melt viscosity of a polypropylene (co)polymer comprising melt mixing a polypropylene (co)polymer in the presence of a specified initiator and styrene, where the melt strength and/or the extensional melt viscosity of the polypropylene (co)polymer is increased during the melt mixing step.

In the process of the present invention, the improved properties of the polymer are derived during the melt mixing step, so that no additional process steps are required. Appropriate selection of the initiator according to the invention produces a polymer having the

desired improved properties, because these initiators show less specificity for the abstraction of tertiary hydrogen atoms from the polymer chains, compared with secondary or primary hydrogen atoms. When a monomer is used in combination with the initiator, and the monomer reacts with the initial polymer chain radical to form an intermediate grafted monomer radical, improved properties of the polymer can be obtained during melt mixing, when the intermediate grafted monomer radical undergoes radical combination in preference to disproportionation or hydrogen abstraction. In particular, the addition of styrene leads to the formation of an intermediate benzylic radical graft on the polymer chain that undergoes radical combination in preference to disproportionation or hydrogen abstraction, thereby providing a polymer with improved properties.

In order to establish *prima facie* under § 103 based upon a single reference, the Examiner must establish all three of the following essential criteria: (1) the cited reference must teach or suggest each of the claimed elements; (2) there must be a motivation in the cited prior art to modify the reference as suggested by the Examiner; and (3) the cited reference must provide a basis for a reasonable expectation for success. The motivation to combine and the reasonable expectation for success must come from the cited prior art and not the Applicants' specification. Further, it is not enough that a reference can be modified absent a suggestion in the cited prior art to undertake such modification.

First, the intermediate radical formed by the reaction of the initial polymer radical and the vinyl silane compound in Nojiri during the first step of melt mixing would not favour radical combination, and thus would not provide an increase in melt strength and/or extensional melt viscosity. In addition, Nojiri does not teach a process where the melt strength and/or the extensional melt viscosity of a polypropylene (co)polymer is increased during the melt mixing



step. In contrast to the radical combination mechanism that couples polymer chains in accordance with the melt mixing process of the present invention, Nojiri teaches a crosslinking reaction that takes place occurs after melt mixing through hydrolysis and subsequent condensation coupling of the silane groups grafted on the polymer chains. Further, claims 15 and 20 of the present invention teach that specified initiators are used in combination with styrene. Nojiri discloses a silane compound containing olefinically unsaturated hydrocarbon groups, and does not teach or suggest styrene. Finally, with respect to claim 19 as amended, Nojiri does not teach an amount of monomer from 0 to 3 times the total moles of initiator. The examples of Nojiri teach a mole ratio of monomer to initiator of between 4 and 12. Therefore, Applicants submit that the cited reference does not teach or suggest all the elements of the presently claimed invention.

Second, Nojiri does not provide a motivation to modify the reference as suggested by the Examiner. In the process of the present invention, the level of crosslinking in the melt mixing is controlled to be uniform and as low as necessary to produce polymer with the desired properties. Nojiri, in contrast, teaches that when the silane compound is grafted to polypropylene, crosslinking reactions are undesirable (col. 3, lines 30-60). The reference also teaches that the process of bringing the polymer into contact with water is conducted post melt-mixing. Crosslinking occurs after the graft polymer is formed by bringing the polymer into contact with water under the action of a silanol condensation catalyst (col. 2, lines 7-10). Therefore, Nojiri teaches away from the present invention. Furthermore, with respect to claims 15 and 20, Nojiri, neither teaches nor suggests the use of styrene. In this regard, Nojiri teaches the use of silane-based compounds, so that modifying the reference in this manner would render Nojiri unsuitable for its intended purpose.

Finally, since as described above, Nojiri teaches away from the presently claimed invention, there has been no showing of a reasonable expectation of success. Applicants therefore respectfully submit that none of the elements of a *prima facie* case of obviousness have been made out. Reconsideration and withdrawal of the rejection respectfully are requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made." Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Should the Examiner have questions or comments regarding this application or this amendment, Applicants' attorney would welcome the opportunity to discuss the case with the Examiner.

It is not believed that any fee is required for entry and consideration of this Amendment; nevertheless, the Commissioner is hereby authorized to charge U.S. PTO Deposit Account 08-2336 in the amount of any such required fee.

This is intended to be a complete response to the Office Action mailed March 26, 2002.

Respectfully submitted,

**GARY PEETERS ET AL.**

9/19/02

(Date)

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I hereby certify that this correspondence is being deposited with sufficient postage thereon with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on September 20, 2002.

John A. Chatter

9/20/02

Date of Signature

a

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**Filed on September 20, 2002**

**In the Specification**

The paragraph beginning at page 2, line 18, and ending at line 26.

DeNicola (EP 384331A2) has disclosed a means to produce a branched propylene polymer material showing a [nett]net increase in the weight average molecular weight by solid state modification of predominantly isotactic semi-crystalline linear polypropylene. The process described in EP384331A2 involves blending peroxides with short half lives (eg peroxy dicarbonates) with linear propylene polymer in a mixing vessel at temperatures from 23°C to 120°C in an inert atmosphere and continuing to mix for a period of time until the peroxide decomposes and polymer fragmentation and branching occurs without significant gelation of the polymer. DeNicola states that at temperatures greater than 120°C no branching or melt strength enhancement is achieved.

The paragraph beginning at page 14, line 14, and ending at page 15, line 15.

Preferred initiators for use in combination with monomers include Dibenzoyl peroxide, o,o'-Bis(methylbenzoyl) peroxide, p,p'-Bis(methylbenzoyl) peroxide, M,M'-Bis(methylbenzoyl) peroxide, o,m'-Bis(methylbenzoyl) peroxide, o,p'-Bis(methylbenzoyl) peroxide, m,p'-Bis(methylbenzoyl) peroxide, Bis(ethylbenzoyl) peroxide (all isomers), Bis(propylbenzoyl) peroxide (all isomers), Bis(butylbenzoyl) peroxide (all isomers), Bis(pentylbenzoyl) peroxide (all isomers), Bis(hexylbenzoyl) peroxide (all isomers), Bis(heptylbenzoyl) peroxide (all isomers), Bis(octylbenzoyl) peroxide (all isomers), Bis(nonylbenzoyl) peroxide (all isomers),

Bis(methoxybenzoyl) peroxide (all isomers), Bis(ethoxybenzoyl) peroxide (all isomers), Bis(propoxybenzoyl) peroxide (all isomers), Bis(butoxybenzoyl) peroxide (all isomers), Bis(pentoxybenzoyl) peroxide (all isomers), Bis(hexyloxybenzoyl) peroxide (all isomers), Bis(heptyloxybenzoyl) peroxide (all isomers), Bis(octyloxybenzoyl) peroxide (all isomers), Bis(nonyloxybenzoyl) peroxide (all isomers), Bis(chlorobenzoyl) peroxide (all isomers), Bis(fluorobenzoyl) peroxide (all isomers), Bis(bromobenzoyl) peroxide (all isomers), Bis(dimethylbenzoyl) peroxide (all isomers), Bis(trimethylbenzoyl) peroxide (all isomers), Bis(tert-butylbenzoyl)peroxide (all isomers), Bis(di-tert-butylbenzoyl)peroxide (all isomers), Bis(tert-butoxybenzoyl)peroxide (all isomers), Bis(ditrimethylsilylbenzoyl) peroxide (all isomers), Bis(heptafluoropropylbenzoyl) peroxide (all isomers), Bis(2,4-dimethyl-6-trimethylsilyl benzoyl) peroxide and isomers, 2,2'(dioxydicarbonyl) bis - Benzoic acid dibutyl ester, tert-butyl perbenzoate, tert-butyl (methyl)perbenzoate (all isomers), tert-butyl (ethyl)perbenzoate (all isomers), tert-butyl (octyl)perbenzoate (all isomers), tert-butyl (nonyl)perbenzoate (all isomers), tert-amyl perbenzoate, tert-amyl (methyl)perbenzoate (all isomers), tert-amyl (ethyl)perbenzoate (all isomers), tert-amyl (octyl)perbenzoate (all isomers), tert-amyl (nonyl)perbenzoate (all isomers), tert-amyl (methoxy)perbenzoate (all isomers), tert-amyl (octyloxy)perbenzoate (all isomers), tert-amyl (nonyloxy)perbenzoate (all isomers), 2-ethylhexyl perbenzoate, 2-ethylhexyl (methyl)perbenzoate (all isomers), [, ]2-ethylhexyl (ethyl)perbenzoate (all isomers), 2-ethylhexyl (octyl)perbenzoate (all isomers), [, ]2-ethylhexyl (nonyl)perbenzoate (all isomers), 2-ethylhexyl (methoxy)perbenzoate (all isomers), 2-ethylhexyl (ethoxy)perbenzoate (all isomers), 2-ethylhexyl (octyloxy)perbenzoate (all isomers), 2-ethylhexyl (nonyloxy)perbenzoate (all isomers), Bis (tertbutylmonoperoxy phthaloyl) diperoxy terephthalate, Bis (tertamylmonoperoxy phthaloyl) diperoxy terephthalate diacetyl phthaloyl



diperoxide, dibenzoyl phthaloyl diperoxide, bis(4 methylbenzoyl) phthaloyl diperoxide, diacetyl terephthaloyl di peroxide, dibenzoyl terephthaloyl diperoxide and Poly[dioxycarbonyldioxy(1,1,4,4-tetramethyl-1,4-butanediyl)] peroxide.

The paragraph beginning at page 16, line 25, and ending at line 28.

It is possible to combine the process of the present invention with other processes of polymer modification or with, for example, the addition of fillers, additives or stabilisers, or blending with other polymers.[ [which do not substantially interfere with the improved properties afforded by the process of the present invention].]

The paragraph beginning at page 17, line 1, and ending at line 4.

In the process of the present invention the polypropylene (co)polymer is melt mixed in the presence of initiator and optionally a monomer. Melt mixing may be carried out by any convenient means capable of mixing the polypropylene (co)polymer at temperatures above the melting point of the polypropylene (co)polymer.

The paragraph beginning at page 25, line 21, and ending at page 26, line 1.

The twin screw extruder used in the examples was a JSW TEX-30 with a 30 mm screw diameter and an overall L/D of 42[ [comprising ten temperature controlled barrel sections (L/D 3.5, temperatures between 120 and 230°C as specified in Table 1), three unheated sampling/monitoring blocks (L/D 1.167) and a cooled feed block (L/D 3.5)) equipped with two JSW TTF20 gravimetric feeders, one K-Tron KQx gravimetric additives feeder and a volumetric liquid addition pump (Fuji Techno Industries model HYM-03-08)]]]. The extruder was operated

in either co-rotating (intermeshing self wiping) or counter rotating (intermeshing non-self wiping) modes with a throughput rate of between 5 and 20 kg/hr and screw speeds of between 100 and 400 rpm as specified in Table 1. The melt temperature and pressures were monitored at three points along the barrel and in the die.

The paragraph beginning at page 44, line 16, and ending at line 18.  
GPC molecular weights were determined using a Waters 150C high temperature GPC unit.  
1,2,4-trichlorobenzene was used as the solvent, eluting through two Ultrastyrigel linear columns.  
The oven temperature was set at 140°C and the pump flow rate was 1.0 ml/min.

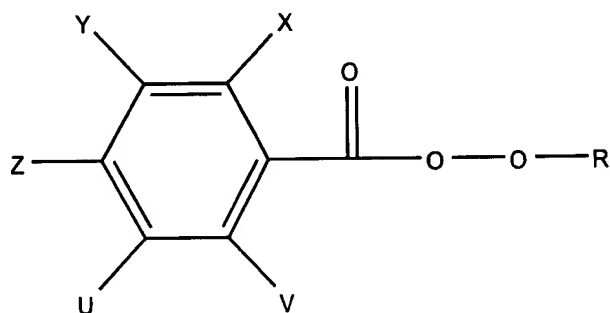
The paragraph beginning at page 46, line 19, and ending at line 20.  
Table 20: Effect of feed throat addition of BPO on the modification of prestabilised PP  
homopolymer [ KM6100 or GWM22] a]

The paragraph beginning at page 47, line 17, and ending at line 18.  
Table 22: Effect of feed throat addition of BPO on the modification of prestabilised PP  
homopolymer [ KM6100 or GWM22] a]

### **In the Claims**

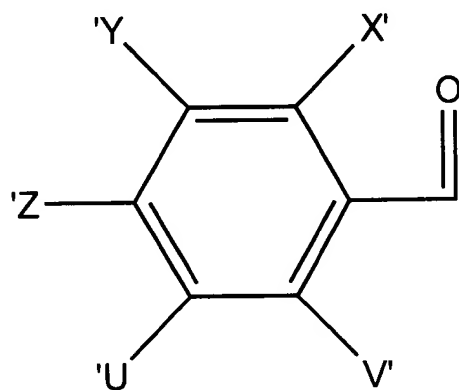
Claims 1, 4, 11, 16, 17, and 19 have been changed by deleting the characters in brackets and adding the underlined material, as reported below. For the Examiner's convenience, even the unchanged claims have been reported in the following.

1. (Amended) A process for increasing the melt strength and/or the extensional melt viscosity of a polypropylene (co)polymer[ wherein said process comprises],the process comprising melt mixing [the]a polypropylene (co)polymer in the presence of an initiator wherein said initiator is selected from the group defined by formula 1[.]:



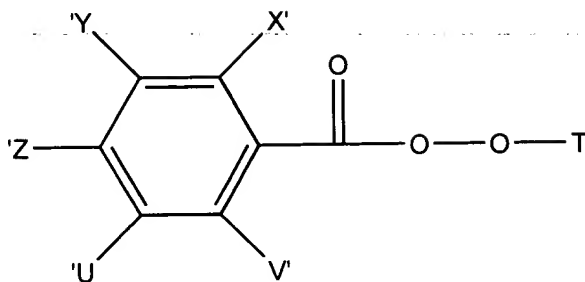
**Formula 1**

wherein R is selected from the group consisting of optionally substituted C<sub>1</sub> to C<sub>18</sub> acyl, optionally substituted C<sub>1</sub> to C<sub>18</sub> alkyl, aroyl defined by formula 2,



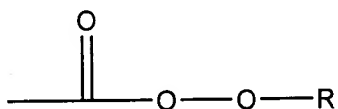
**Formula 2**

and groups of formula 3,



**Formula 3**

wherein U, V, X, Y, Z, U', V', X', Y' and Z' are independently selected from the group consisting of hydrogen, halogen, C1-C18 alkyl, C1-C18 alkoxy, aryloxy, acyl, acyloxy, aryl, carboxy, alkoxycarbonyl, aryloxycarbonyl, trialkyl silyl, hydroxy, or a moiety of formula 4,

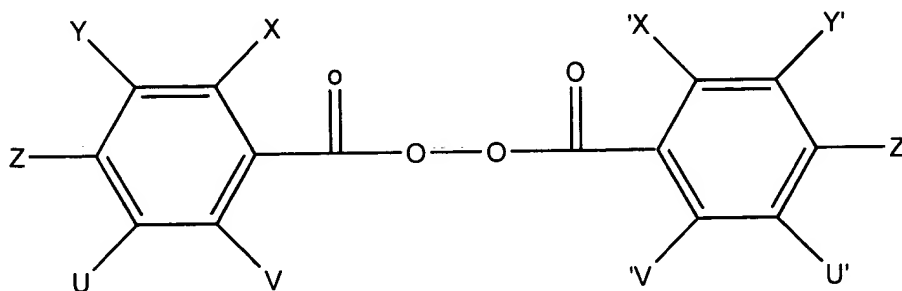


**Formula 4**

and wherein T is alkylene;

wherein the melt strength and/or the extensional melt viscosity of the polypropylene (co)polymer is increased during the melt mixing step.

2. A process according to claim 1 wherein the initiator is selected from compounds of formula 6.



**Formula 6**

where X, Y, Z, U, V, X', Y', Z', U', V' are independently selected from the group consisting of hydrogen and C<sub>1</sub> - C<sub>18</sub> alkyl where at least one of X, Y, Z, U, V and X', Y', Z', U', V' are not hydrogen.

3. A process according to claim 2 wherein the initiator is selected from the group consisting of Dibenzoyl peroxide, o,o'-Bis(methylbenzoyl) peroxide, p,p'-Bis(methylbenzoyl) peroxide, M,M'-Bis(methylbenzoyl) peroxide, o,m'-Bis(methylbenzoyl) peroxide, o,p'-Bis(methylbenzoyl) peroxide, m,p'-Bis(methylbenzoyl) peroxide, Bis(ethylbenzoyl) peroxide (all isomers), Bis(propylbenzoyl) peroxide (all isomers), Bis(butylbenzoyl) peroxide (all isomers), Bis(pentylbenzoyl) peroxide (all isomers), Bis(hexylbenzoyl) peroxide (all isomers), Bis(heptylbenzoyl) peroxide (all isomers), Bis(octylbenzoyl) peroxide (all isomers), Bis(nonylbenzoyl) peroxide (all isomers), Bis(methoxybenzoyl) peroxide (all isomers), Bis(ethoxybenzoyl) peroxide (all isomers), Bis(propoxybenzoyl) peroxide (all isomers), Bis(butoxybenzoyl) peroxide (all isomers), Bis(pentoxybenzoyl) peroxide (all isomers), Bis(hexyloxybenzoyl) peroxide (all isomers), Bis(heptyloxybenzoyl) peroxide (all isomers), Bis(octyloxybenzoyl) peroxide (all isomers), Bis(nonyloxybenzoyl) peroxide (all isomers), Bis(chlorobenzoyl) peroxide (all isomers), Bis(fluorobenzoyl) peroxide (all isomers), Bis(bromobenzoyl) peroxide (all isomers), Bis(dimethylbenzoyl) peroxide (all isomers), Bis(trimethylbenzoyl) peroxide (all isomers), Bis(tert-butylbenzoyl)peroxide (all isomers), Bis(di-tert-butylbenzoyl)peroxide (all isomers), Bis(tert-butoxybenzoyl)peroxide (all isomers), Bis(ditrimethylsilylbenzoyl) peroxide (all isomers), Bis(heptafluoropropylbenzoyl) peroxide (all isomers), Bis(2,6-dimethyl-4- trimethylsilyl benzoyl) peroxide and isomers,

2,2'(dioxycarbonyl) bis - Benzoic acid dibutyl ester where the term "all isomers" refers to any variation in the position of the ring substituent as well as the structure of the substituent itself i.e. for propyl; n-propyl and isopropyl.

4. (Amended) A process according to claim 1 wherein the initiator is selected from the group consisting of tert-butyl perbenzoate, tert-butyl (methyl)perbenzoate (all isomers), tert-butyl (ethyl)perbenzoate (all isomers), tert-butyl (octyl)perbenzoate (all isomers), tert-butyl (nonyl)perbenzoate (all isomers), tert-amyl perbenzoate, tert-amyl (methyl)perbenzoate (all isomers), tert-amyl (ethyl)perbenzoate (all isomers), tert-amyl (octyl)perbenzoate (all isomers), tert-amyl (nonyl)perbenzoate (all isomers), tert-amyl (methoxy)perbenzoate (all isomers), tert-amyl (octyloxy)perbenzoate (all isomers), tert-amyl (nonyloxy)perbenzoate (all isomers), 2-ethylhexyl perbenzoate, 2-ethylhexyl (methyl)perbenzoate (all isomers), [, ]2-ethylhexyl (ethyl)perbenzoate (all isomers), 2-ethylhexyl (octyl)perbenzoate (all isomers), [, ]2-ethylhexyl (nonyl)perbenzoate (all isomers), 2-ethylhexyl (methoxy)perbenzoate (all isomers), 2-ethylhexyl (ethoxy)perbenzoate (all isomers), 2-ethylhexyl (octyloxy)perbenzoate (all isomers), and 2-ethylhexyl (nonyloxy)perbenzoate (all isomers).

5. A process according to claim 1 wherein the initiator is selected from the group consisting of Bis (tertbutylmonoperoxy phthaloyl) diperoxy terephthalate, Bis (tertamylmonoperoxy phthaloyl) diperoxy terephthalate diacetyl phthaloyl diperoxide, dibenzoyl phthaloyl diperoxide, bis(4 methylbenzoyl) phthaloyl diperoxide, diacetyl terephthaloyl di peroxide, dibenzoyl terephthaloyl diperoxide, Poly[ dioxycarbonyldioxy(1,1,4,4-tetramethyl-1,4-butanediyl)] peroxide.

6. A process according to claim 1 wherein the initiator has a 0.1 hour half life in the range 100 - 170°C.
7. A process according to claim 1 wherein the initiator is present in the range of from 0.004 to 0.25 moles of initiator per kg of the polypropylene homopolymer or copolymer.
8. A process according to claim 1 wherein the initiator is present in the range of from 0.006 to 0.10 moles of initiator per kg of the polypropylene homopolymer or copolymer.
9. A process according to claim 1 wherein the initiator is present in the range of from 0.01 to 0.05 moles of initiator per kg of the polypropylene homopolymer or copolymer.
10. A process according to claim 1 wherein there is no added monomer and the initiator is selected from the group consisting of Dibenzoyl peroxide, o,o'-Bis(methylbenzoyl) peroxide, p,p'-Bis(methylbenzoyl) peroxide, o,o'-Bis(methylbenzoyl) peroxide, o,m'-Bis(methylbenzoyl) peroxide, o,p'-Bis(methylbenzoyl) peroxide, m,p'-Bis(methylbenzoyl) peroxide, Bis(ethylbenzoyl) peroxide (all isomers), Bis(propylbenzoyl) peroxide (all isomers), Bis(butylbenzoyl) peroxide (all isomers), Bis(pentylbenzoyl) peroxide (all isomers), Bis(hexylbenzoyl) peroxide (all isomers), Bis(heptylbenzoyl) peroxide (all isomers), Bis(octylbenzoyl) peroxide (all isomers), Bis(nonylbenzoyl) peroxide (all isomers), Bis(methoxybenzoyl) peroxide (all isomers), Bis(ethoxybenzoyl) peroxide (all isomers), Bis(propoxybenzoyl) peroxide (all isomers), Bis(butoxybenzoyl) peroxide (all isomers),

Bis(pentoxylbenzoyl) peroxide (all isomers), Bis(hexyloxybenzoyl) peroxide (all isomers), Bis(heptyloxybenzoyl) peroxide (all isomers), Bis(octyloxybenzoyl) peroxide (all isomers), Bis(nonyloxybenzoyl) peroxide (all isomers), Bis(chlorobenzoyl) peroxide (all isomers), Bis(fluorobenzoyl) peroxide (all isomers), Bis(bromobenzoyl) peroxide (all isomers), Bis(dimethylbenzoyl) peroxide (all isomers), Bis(trimethylbenzoyl) peroxide (all isomers), Bis(tert-butylbenzoyl)peroxide (all isomers), Bis(di-tert-butylbenzoyl)peroxide (all isomers), Bis(tertbutoxybenzoyl)peroxide (all isomers), Bis(ditrimethylsilylbenzoyl) peroxide (all isomers), Bis(heptafluoropropylbenzoyl) peroxide (all isomers), Bis(2,4-dimethyl-6-trimethylsilyl benzoyl) peroxide and isomers tert-amyl perbenzoate, tert-amyl (methyl)perbenzoate (all isomers), tert-amyl (ethyl)perbenzoate (all isomers), tert-amyl (octyl)perbenzoate (all isomers), tert-amyl (nonyl)perbenzoate (all isomers), tert-amyl (methoxy)perbenzoate (all isomers), tert-amyl (octyloxy)perbenzoate (all isomers), tert-amyl (nonyloxy)perbenzoate (all isomers), Bis (tertamylmonoperoxy phthaloyl) diperoxy terephthalate, diacetyl phthaloyl diperoxide, dibenzoyl phthaloyl diperoxide, bis(4-methylbenzoyl) phthaloyl diperoxide, diacetyl terephthaloyl di peroxide and dibenzoyl terephthaloyl diperoxide.

11. (Amended) A process according to claim 10 wherein the initiator is [more preferably the initiators are ]selected from the group consisting of dibenzoyl peroxide, o,o'-Bis(methylbenzoyl) peroxide, p,p'-Bis(methylbenzoyl) peroxide, M,M'-Bis(methylbenzoyl) peroxide, o,m'-Bis(methylbenzoyl) peroxide, o,p'-Bis(methylbenzoyl) peroxide, and m,p'-Bis(methylbenzoyl) peroxide.



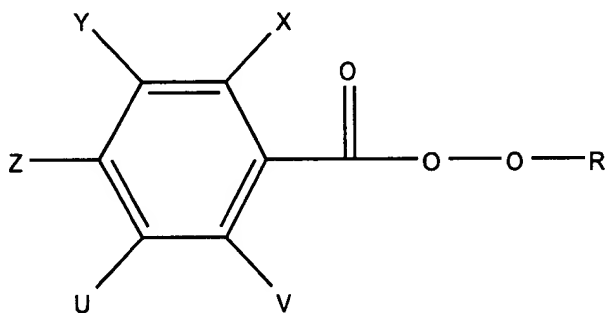
12. A process according to claim 1 wherein the initiator is used in combination with a monomer.
13. A process according to claim 12 wherein the amount of monomer is up to 5 times the total moles of initiator.
14. A process according to claim 12 or claim 13 wherein the monomer is a monoene monomer.
15. A process according to claim 12 or claim 13 wherein the monomer is styrene.
16. (Amended) A process according to claim 12 wherein the initiator is selected from the group consisting of Dibenzoyl peroxide, o,o'-Bis(methylbenzoyl) peroxide, p,p'-Bis(methylbenzoyl) peroxide, M,M'-Bis(methylbenzoyl) peroxide, o,m'-Bis(methylbenzoyl) peroxide, o,p'-Bis(methylbenzoyl) peroxide, m,p'-Bis(methylbenzoyl) peroxide, Bis(ethylbenzoyl) peroxide (all isomers), Bis(propylbenzoyl) peroxide (all isomers), Bis(butylbenzoyl) peroxide (all isomers), Bis(pentylbenzoyl) peroxide (all isomers), Bis(hexylbenzoyl) peroxide (all isomers), Bis(heptylbenzoyl) peroxide (all isomers), Bis(octylbenzoyl) peroxide (all isomers), Bis(nonylbenzoyl) peroxide (all isomers), Bis(methoxybenzoyl) peroxide (all isomers), Bis(ethoxybenzoyl) peroxide (all isomers), Bis(propoxybenzoyl) peroxide (all isomers), Bis(butoxybenzoyl) peroxide (all isomers), Bis(pentoxylbenzoyl) peroxide (all isomers), Bis(hexyloxybenzoyl) peroxide (all isomers), Bis(heptyloxybenzoyl) peroxide (all isomers), Bis(octyloxybenzoyl) peroxide (all isomers),

Bis(nonyloxybenzoyl) peroxide (all isomers), Bis(chlorobenzoyl) peroxide (all isomers), Bis(fluorobenzoyl) peroxide (all isomers), Bis(bromobenzoyl) peroxide (all isomers), Bis(dimethylbenzoyl) peroxide (all isomers), Bis(trimethylbenzoyl) peroxide (all isomers), Bis(tert-butylbenzoyl)peroxide (all isomers), Bis(di-tert-butylbenzoyl)peroxide (all isomers), Bis(tert-butoxybenzoyl)peroxide (all isomers), Bis(ditrimethylsilylbenzoyl) peroxide (all isomers), Bis(heptafluoropropylbenzoyl) peroxide (all isomers), Bis(2,4-dimethyl-6-trimethylsilyl benzoyl) peroxide and isomers, 2,2'(dioxydicarbonyl) bis - Benzoic acid dibutyl ester, tert-butyl perbenzoate, tert-butyl (methyl)perbenzoate (all isomers), tert-butyl (ethyl)perbenzoate (all isomers), tert-butyl (octyl)perbenzoate (all isomers), tert-butyl (nonyl)perbenzoate (all isomers), tert-amyl perbenzoate, tert-amyl (methyl)perbenzoate (all isomers), tert-amyl (ethyl)perbenzoate (all isomers), tert-amyl (octyl)perbenzoate (all isomers), tert-amyl (nonyl)perbenzoate (all isomers), tert-amyl (methoxy)perbenzoate (all isomers), tert-amyl (octyloxy)perbenzoate (all isomers), tert-amyl (nonyloxy)perbenzoate (all isomers), 2-ethylhexyl perbenzoate, 2-ethylhexyl (methyl)perbenzoate (all isomers), [ , ]2-ethylhexyl (ethyl)perbenzoate (all isomers), 2-ethylhexyl (octyl)perbenzoate (all isomers), [ , ]2-ethylhexyl (nonyl)perbenzoate (all isomers), 2-ethylhexyl (methoxy)perbenzoate (all isomers), 2-ethylhexyl (ethoxy)perbenzoate (all isomers), 2-ethylhexyl (octyloxy)perbenzoate (all isomers), 2-ethylhexyl (nonyloxy)perbenzoate (all isomers), Bis (tertbutylmonoperoxy phthaloyl) diperoxy terephthalate, Bis (tertamylmonoperoxy phthaloyl) diperoxy terephthalate diacetyl phthaloyl diperoxide, dibenzoyl phthaloyl diperoxide, bis(4 methylbenzoyl) phthaloyl diperoxide, diacetyl terephthaloyl di peroxide, dibenzoyl terephthaloyl diperoxide and Poly[ dioxycarbonyldioxy(1,1,4,4-tetramethyl-1,4-butanediyl)] peroxide.

17. (Amended) A modified polypropylene produced according to [any one of the processes of claims 1, 10 and 12]claim 1.

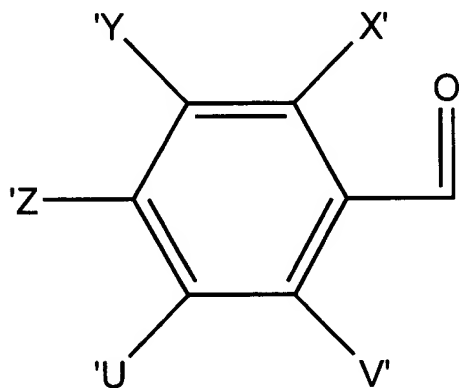
18. A process wherein the modified polypropylene of claim 17 is melt mixed with an unmodified polypropylene to produce a modified polypropylene.

19. (Amended) A process for modifying an  $\alpha$ -olefin polymer wherein said process comprises melt mixing the  $\alpha$ -olefin polymer in the presence of an initiator and optionally a monoene monomer wherein said initiator is selected from the group defined by formula 1.



**Formula 1**

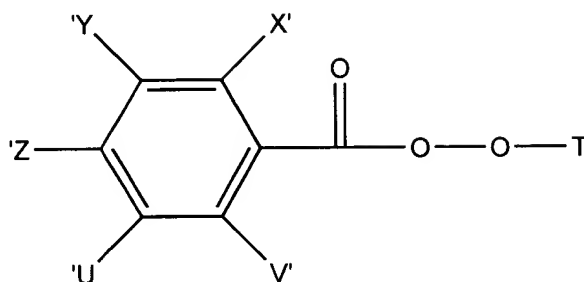
wherein R is selected from the group consisting of optionally substituted  $\text{C}_1$  to  $\text{C}_{18}$  acyl, optionally substituted  $\text{C}_1$  to  $\text{C}_{18}$  alkyl, aroyl defined by formula 2,



*A*

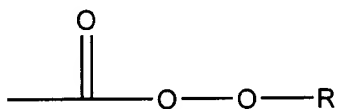
**Formula 2**

and groups of formula 3,



**Formula 3**

wherein U, V, X, Y, Z, U', V', X', Y' and Z' are independently selected from the group consisting of hydrogen, halogen, C1-C18 alkyl, C1-C18 alkoxy, aryloxy, acyl, acyloxy, aryl, carboxy, alkoxycarbonyl, aryloxycarbonyl, trialkyl silyl, hydroxy, or a moiety of formula 4,



**Formula 4**

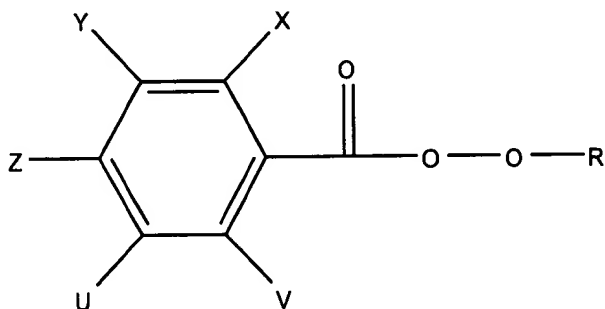
and wherein T is alkylene;

and wherein the amount of monomer is 0 to [5]3 times the total moles of initiator.

20. (New) A process for increasing the melt strength and/or the extensional melt viscosity of a polypropylene (co)polymer, the process comprising melt mixing a polypropylene (co)polymer

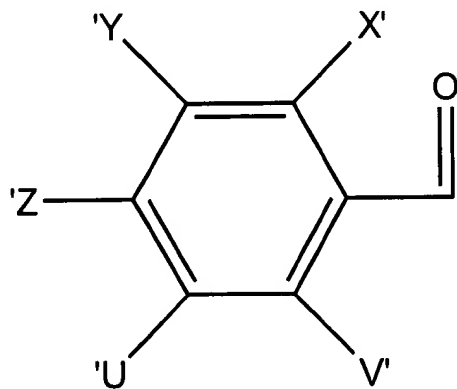
*a*

in the presence of an initiator and styrene wherein said initiator is selected from the group defined by formula 1:



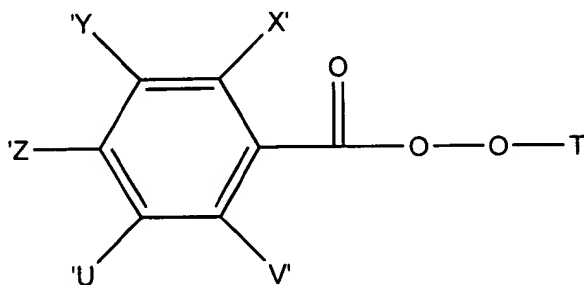
**Formula 1**

wherein R is selected from the group consisting of optionally substituted C<sub>1</sub> to C<sub>18</sub> acyl, optionally substituted C<sub>1</sub> to C<sub>18</sub> alkyl, aroyl defined by formula 2,



**Formula 2**

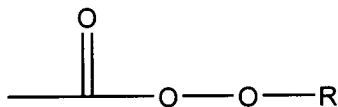
and groups of formula 3.



**Formula 3**

a

wherein U, V, X, Y, Z, U', V', X', Y' and Z' are independently selected from the group consisting of hydrogen, halogen, C1-C18 alkyl, C1-C18 alkoxy, aryloxy, acyl, acyloxy, aryl, carboxy, alkoxycarbonyl, aryloxycarbonyl, trialkyl silyl, hydroxy, or a moiety of formula 4,



**Formula 4**

and wherein T is alkylene, and where styrene is up to five times the total moles of initiator;

wherein the melt strength and/or the extensional melt viscosity of the polypropylene (co)polymer is increased during the melt mixing step.